

RESEARCH HIGHLIGHTS

Selections from the scientific literature

GEOLOGY

Ancient impact recorded in rock

South African rocks reveal that a huge asteroid smashed into Earth 3.26 billion years ago, turning sediments to liquid.

The rocks in the Barberton greenstone belt in South Africa contain tiny blobs of material that condensed from clouds of rock vapour generated by ancient impacts. Norman Sleep and Donald Lowe of Stanford University in California used those blobs, along with other features of the Barberton rocks, to calculate the size and geological effects of this particular asteroid impact.

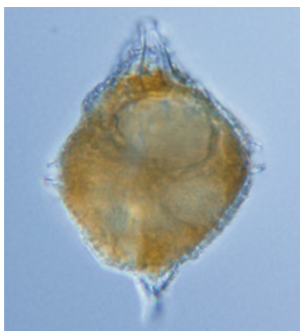
The duo found that the asteroid was probably 50 kilometres across. Seismic waves from the impact fractured much of Earth's crust, triggering strong earthquakes and giant tsunamis, the authors say. *Geochem. Geophys. Geosys.* <http://doi.org/sb4> (2014)

ORGANISMAL BIOLOGY

'Extinct' plankton found in Pacific

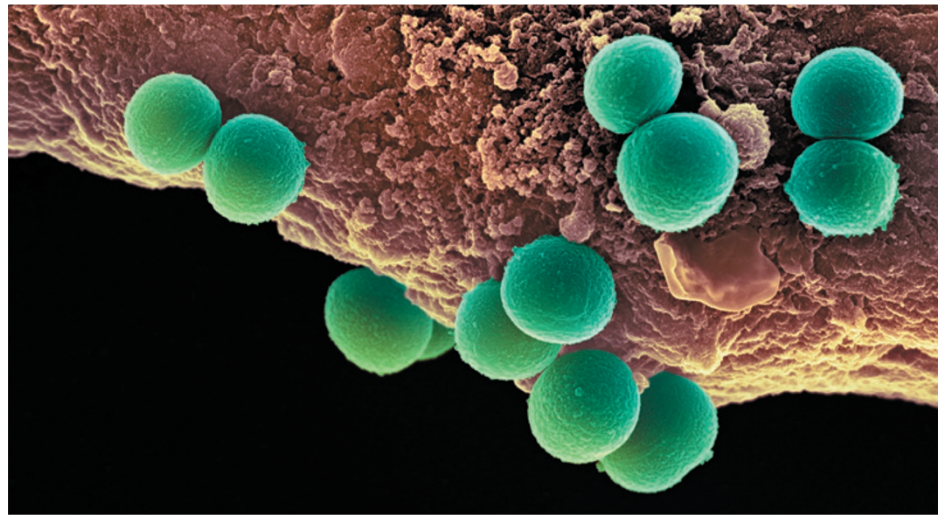
A plankton species thought to have gone extinct more than a million years ago has been found living in the western Pacific Ocean.

Kenneth Mertens of Ghent



University in Belgium and his colleagues discovered live cysts of the dinoflagellate plankton *Dapsilidinium pastielsii* (pictured) in the sea floor from Japan to the Philippines and Indonesia. This stably warm region, known as the Indo-Pacific Warm Pool, harbours high levels of biodiversity.

The warm waters there could have provided a haven for *D. pastielsii* to survive in the water column and sediment. Such areas of refuge will be important for maintaining biodiversity in a changing climate, the authors say. *Geology* <http://doi.org/sb7> (2014)



ANTIMICROBIALS

Biocide boosts bacterial binding

People exposed to an antimicrobial compound used in many consumer products are more likely to carry an opportunistic pathogen, increasing their risk of infection.

The bacterium *Staphylococcus aureus* (pictured in green) is normally harmless in healthy adults but can cause serious infections in sick or injured people. A team led by Blaise Boles at the University of Michigan in Ann Arbor found that people with higher levels of the biocide triclosan in their nasal secretions

had *S. aureus* colonies in their noses more frequently than people with little or no triclosan in their secretions. Triclosan, which is used in toothpastes, soaps and medical equipment, increased the binding of *S. aureus* to plastic, glass and human proteins such as collagen and keratin.

The results suggest an urgent need to re-evaluate the use of triclosan in consumer products, the authors say. *mBio* 5, e01015-13 (2014)

ANIMAL BEHAVIOUR

Fruit-fly microbes draw more flies

Researchers have pinpointed a chemical source that attracts fruit flies to food: the gut bacteria of fruit-fly larvae sitting on the food.

Reuven Dukas and his colleagues at McMaster University in Hamilton, Canada, previously showed that fruit flies (*Drosophila melanogaster*) are attracted to food occupied by larvae. Now they find that the flies prefer food that has been inhabited by larvae with intact gut

microbiomes rather than by bacteria-free larvae.

The authors also show that this attraction is not related to the presence of gut bacteria or larvae in the food, but to the physical changes that the feeding larvae make. Used food is easier for a larva to burrow into than fresh food, they say. *J. Exp. Biol.* 217, 1346-1352 (2014)

ASTRONOMY

Earth twin spotted in habitable zone

Astronomers have discovered a planet that is a similar size to Earth orbiting a cool, dim

SPL

YOSHIHITO TAKANO

star at just the right distance for liquid water to exist. It is the most Earth-like planet found so far that could potentially host life.

A team led by Elisa Quintana of the SETI Institute in Mountain View, California, discovered the planet, Kepler-186f, by looking at data from NASA's Kepler space telescope. Slight drops in a star's brightness revealed the orbiting planet, the fifth known in that particular system.

Kepler-186f is just 1.1 times the size of Earth and orbits its star every 130 days. It is towards the outer edge of the star's habitable zone — in our Solar System, it would be equivalent to putting Earth out near the orbit of Mars.

Science 344, 277–280 (2014)
For a longer story on this research, see go.nature.com/tmbgje

MICROBIAL EVOLUTION

How a flesh-eater evolved

A deadly wave of flesh-eating bacteria emerged in the 1980s when a single cell gained a pair of toxin genes from another bacterium.

Infections with group A *Streptococcus* (GAS) strains, which cause necrotizing fasciitis, spiked worldwide in the late 1980s and early 1990s. To piece together the sequence of molecular events behind this epidemic, James Musser at the Houston Methodist Research Institute in Texas and his team sequenced the genomes of 3,615 GAS strains isolated from Europe and North America between 1969 and 2013.

Analysis of the genomes revealed a series of genetic changes that began to occur in the early 1970s. The final changes that took place before the strain became a voracious flesh-eater happened in around 1983, when less-virulent strains acquired the genes that are needed to produce certain toxins in humans.

Proc. Natl Acad. Sci. USA
<http://doi.org/sdc> (2014)

PHYSICS

Liquid bubbles stop sound

Liquid foam can block the transmission of ultrasound, report Valentin Leroy at Paris Diderot University and his colleagues.

The French team created the foam by bubbling an insoluble gas, perfluorohexane, into water containing a surfactant, and then sent ultrasound through the foam.

The elastic, thin films at the edges of adjacent foam bubbles reflected the sound waves. The exact frequencies that were blocked varied with the average bubble size, the biggest of which measured up to 50 micrometres in radius.

The findings show that foams can act as acoustic metamaterials — materials that block sound waves because of their unique structure.

Phys. Rev. Lett. 112, 148307 (2014)

MICROBIOLOGY

Bacteria elbow out the competition

Some microorganisms push others out of the way to gain better access to oxygen.

Wook Kim and Kevin Foster at the University of Oxford, UK, studied the soil bacterium *Pseudomonas fluorescens*, which grows in dense layers called biofilms.

They found that a strain that consistently outgrew others and dominated the colony carried a mutation in a gene called *rsmE*. This mutant strain secretes polymers that expand, nudging neighbours aside and allowing cells to reach the colony surface where they can receive the most oxygen.

Life in tightly packed communities has selected for this bacterial pushiness, the authors say.

Proc. Natl Acad. Sci. USA
<http://doi.org/sb5> (2014)

SOCIAL SELECTION

Popular articles
on social media

Illegal fishing hooks online attention

Researchers on Twitter were astounded by some of the figures given in a paper describing extensive illegal fish imports into the United States. According to Tony Pitcher at the University of British Columbia in Vancouver and his colleagues, in 2011 more than 20% of wild-caught seafood coming into the country — worth between US\$1.3 billion and \$2.1 billion — was from illegal or unreported fishing. To make their estimates, the researchers used data from the US National Marine Fisheries Service for 30 major seafood products from 10 countries. Illegal, unreported and unregulated fishing disrupts ecosystems, food security and livelihoods around the world, the authors say.

Mar. Policy 48, 102–113 (2014)



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ZOOLOGY

Sex changed in Brazilian insect

Female insects in Brazilian caves initiate reproduction, and they do so with a penis.

Kazunori Yoshizawa at Hokkaido University in Sapporo, Japan, and his colleagues studied four *Neotrogla* species, one of which copulates for up to 70 hours. The authors found that the female uses an external organ (pictured) during sex to penetrate the male and to receive sperm for both reproduction and nutrition. All of the species have spines on the penis-like

structure, which the females use to anchor themselves in the male genital chamber.

The competition between females for mates might have driven the evolution of this elaborate sexual structure, the authors say. However, this is the only known case of reversed sex organs in animals with reversed sexual roles, they add.

Curr. Biol. <http://dx.doi.org/10.1016/j.cub.2014.03.022> (2014)

For a longer story on this research, see go.nature.com/ptnetb

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